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POSSIBLE COMPLICATIONS OF THE COMPENSATED DOLLAR

In discussing Professor Irving Fisher's most ingenious plan for a dollar of stable purchasing power, there seems to be some confusion as to what virtues are claimed for the plan and what are not; and Professor Kinley's recent article on the subject¹ bears traces of this confusion. The advocates of the plan do not claim, for instance, that it would prevent any one commodity or class of commodities from rising or falling in price relative to others, but they do claim that it would remove the cause that has given us the strange phenomenon of falling prices for bonds and rising prices for everything else, so that the most conservative have suffered while those who took risks have gained. It would not mend the lamentable inequality in the sharing of this world's goods, but it would lessen or stop the shrinkage in the buying power of fixed incomes. It would not prevent a falling off in the productive power of the human race if the law of diminishing returns decrees such a falling off, but it would tend to prevent business men as a class from being in ignorance whether their profits for the past year are due to superior efficiency or merely to the fact that their outgo in wages and interest has not yet caught up to their income, as prices take their upward course.² In the one case he who is making such gains should expand his business; in the other case to do so would sow the seeds of panic. Would not business be sounder and ultimately more productive with the second kind of profits eliminated?

The proposed standard of value is, to be sure, not ideally perfect. To gain perfection, we should have to create a standard that would run in terms of human efforts rather than in terms of mere commodities. But compared with gold alone, the standard based on index numbers would come so much nearer perfection, that it is well worth striving for.

The following study is a friendly search for practical difficulties in the proposed plan, in which the main contentions may be summarized as follows:

I. Under Fisher's plan a rise in the redemption weight of the dollar carries with it automatically a shrinkage in the redemption power of the gold reserve.

¹ AMERICAN ECONOMIC REVIEW, March, 1913, p. 1.

² See Irving Fisher, *The Purchasing Power of Money*, ch. 4, especially p. 63.

II. If the plan were adopted universally, so much gold would be thrown on the bullion market that its value would probably fall between one half and one third, provided the production of gold were to shrink between one third and one half in response to the fall in value. Otherwise the fall might be still greater. To keep prices steady under these conditions would call for much quicker changes in the weight of the dollar than Professor Fisher's plan contemplates. The crux of this proposition consists of an empirical study of the elasticity of the industrial demand for gold, the results of which are used in the course of the argument, while the full calculations will be found in the appendix at the end of this article.

III. If the plan were adopted by an international agreement among nations holding two thirds of the world's gold money, the resulting fall in value would be spread over a term of ten or fifteen years, and would not amount to more than twenty-five or thirty per cent from this cause alone.

IV. Gradual adoption by one country after another would place the heaviest loss on the governments that were first to make the change.

V. Two further possibilities are to be noted.

(1) The gains that Professor Fisher expects to accrue to the government from the operations of issue and redemption might be turned into losses if the changes in the value of gold were long continued.

(2) The governments would ultimately be forced into the bullion market to replenish their reserves, a policy which would present its own difficulties of administration.

Let us take up these propositions in detail.

One point which has been much neglected is the matter of the gold reserve which must be held to ensure redemption of the proposed currency, as of all other forms of credit money. Now the gold reserve under this scheme would be in a most novel position. When the United States issues gold certificates, all it has to do is to keep under lock and key the gold paid for them and be sure of a reserve always equal to 100 per cent of the claims against it. But under the new system, every time the redemption weight of the dollar is raised, every ounce of gold in the vaults will be able to redeem fewer dollars than before, so that there will be an automatic shrinkage in the ratio of assets to liabilities of that department of the Treasury which has to do with the issue and redemption of currency.

At present the available gold, both in the Treasury and out, amounts to some 64 per cent of all the government currency, including silver dollars and certificates whose value may be regarded as really resting on the gold reserve. Let us suppose, for the sake of simplicity, that we start by exchanging all our outstanding government currency for certificates and tokens of the new sort and that all the gold remains in the issue department of the Treasury. The natural result would be a gold reserve of about 64 per cent of all the claims against it.³ If the silver bullion were gradually sold and the proceeds turned over to the issue department, this reserve might be increased by almost 10 per cent, although some of this silver would in any case be kept to be coined into dimes, quarters, half-dollars, and even perhaps dollars, so far as these may be demanded in certain sections for pocket-change.

Let us say, then, that we start with a gold reserve of 70 per cent, a figure which gives the Treasury the benefit of the doubt as to the marketableness of the silver bullion. Now if, in the first year, prices of commodities in terms of gold rise 3 per cent and the redemption weight of the dollar is raised accordingly, this reserve will automatically have dwindled to a trifle less than 68 per cent, by the increase in the amount of gold the holders of currency are entitled to demand; and if the value of gold were to fall 50 per cent so that the gold content of the dollar had to be doubled and no further currency were minted in the meantime, the gold reserve would then stand at 35 per cent, though containing as many ounces as before. Any currency that might have been minted at values between 26 grains per dollar⁴ and 52 grains per dollar, would have increased the gold reserve somewhat and so have had a mitigating effect on the reserve ratio; but this relief, for reasons to be given below, may be expected to be but slight, and may even be ultimately turned into an actual source of loss.

Under such conditions the Secretary of the Treasury might share some of the uncanny sensations of Alice in the Looking-glass Country, racing with the Red Queen, for it would take some running to stay in the same place. Not that the United States

³ Based on *Report of the Director of the Mint*, 1910, p. 55, disregarding bank notes and counting as outstanding all money except the assets of the issue department of the Treasury.

⁴ The figure obtained by taking the weight of the recent dollar, 25.8 gr. and adding the proposed brassage charge of 1 per cent is 26.058 gr.

Treasury is not strong enough to maintain its *status quo* if it chooses, but it would be forced either to buy bullion in the market, paying for it out of current revenues, to replenish the fund, or else to see it lie physically intact but financially dwindling with every fall in the purchasing power of gold.

It is suggested that we will need no large cash reserve,⁵ and it is urged in support of this that those countries which have tried the gold-exchange standard have found no large gold fund necessary to support the value of their silver coinage. But it must be remembered that in these cases the redemption value of the coin was fixed at a point but little higher than its bullion value, so that every coin redeemed represented an income of silver bullion almost as great as the outgo in gold drafts; and the true bullion reserve, including the market value of that in the coins themselves, is very big indeed. The gold reserve that is sufficient under these circumstances is no criterion of that necessary to support a currency which has no bullion value.

For purposes of discussion, all the available gold has been counted in the cash reserve. If some of it were to remain in circulation as coins (converted into tokens), the fundamental situation would be unchanged, but the gold remaining in the Treasury would appear as a smaller percentage of the number of dollars outstanding, and so the situation would not be relieved by this policy. It would seem that in the matter of gold reserve we should rather be guided by the experience of gold-standard countries in their use of credit money, always remembering that there is a bank note and bank credit system to be superimposed on the governmental currency. Judging by this standard, we should keep a large specie reserve.

If every rise in prices of commodities, measured in gold, means a weakening of the reserves, it is of some interest to estimate the probable or possible future increase of such prices. According to Professor Fisher, they are "almost sure to continue to rise in the next decade or two, probably as fast on the average as 2 per cent per annum," while "no upper limit is assigned to the possible rate of rise."⁶ This under existing monetary systems; but under the new system gold will depreciate faster, through the flooding

⁵ This was written before seeing Professor Fisher's statement of 50 per cent as a prudent reserve. *AMERICAN ECONOMIC REVIEW*, Supplement, March, 1913, p. 49.

⁶ *AMERICAN ECONOMIC REVIEW*, vol. II (Sept., 1912), p. 557.

of the industrial bullion market with gold no longer taken by the mints, as Professor Fisher himself states.⁷

How far, under such circumstances, would gold depreciate? Obviously, the answer depends, among other things, on how widely the scheme is adopted. In trying to make some calculation of the probabilities, the simplest way is to start on the heroic assumption that the whole world adopts the plan, and then to work backward to the milder effects of partial adoption. Part of the evidence used will be Professor Fisher's own calculations of the equation of exchange, and whether the reader believes these to be true or not, he must admit that their use does no injustice to Professor Fisher. The results of this inquiry may be presented in the following propositions.

(1) If the plan is successful in maintaining the existing price level, this will mean that the increase of the world's money supply will have ceased, or almost ceased. According to Professor Fisher's calculations, the probable growth in the rapidity of circulation of money and especially in the scope and efficiency of banking operations in the next ten or fifteen years will be sufficient to carry on the world's trade at the existing price level without any addition to the money supply.⁸ To have maintained a steady level of prices in the United States from 1896 to 1909, would have required an increase of but \$90,000,000 in the money supply, instead of the actual increase of \$730,000,000.⁹ If these figures are correct, we may safely conclude that either (a) the cash reserves would not be replenished by any great amount of new gold brought in to exchange for an increased amount of credit dollars, and pretty nearly the entire gold output would find its way to the industrial bullion market, or else (b) the money supply would go on increasing, prices would go on rising, and the plan would, for the time being, fail of its object.

(2) When the plan succeeds in steadying prices, enough gold bullion will have been diverted into industrial uses to treble, approximately, the supply in this market (leaving out of account for the time being any possible shrinkage in gold mining). For the bullion market will get the whole, or practically the whole, of the world's output, instead of absorbing only one third as heretofore.¹⁰

⁷ *Quarterly Journal of Economics*, vol. XXVII (Feb., 1913), pp. 394-396.

⁸ AMERICAN ECONOMIC REVIEW, vol II, p. 553, line 2 of table shows money and prices increasing at the same rate.

⁹ Based on table in Fisher's *Purchasing Power of Money*, p. 304.

¹⁰ Figures of the world's gold production and industrial consumption in

(3) The elasticity of the industrial demand for gold is such that trebling the supply may be expected to reduce the value to about one third its former level. This proposition is, of course, vital to the whole argument, but the detailed calculations that lead to it would burden the reader with a long digression if they were introduced here. Suffice it to say that, after estimating the normal growth of gold consumption, apart from the effect of price changes, the variations of actual gold consumption from the estimated normal rate are found to correspond very closely to changes in its general purchasing power. When prices rise, gold consumption is stimulated, and vice versa, and the changes in the index number of prices are on the average 1.03 times as great as the corresponding changes in gold consumption, the observations covering a period of thirty years, including both rising and falling prices. The entire calculation will be found in the appendix at the end of this article.

(4) Allowing for possible shrinkage in gold production as a result of the fall in the value of gold, it seems probable that the bullion supply would still be increased 50 to 100 per cent, so that gold would lose from one third to one half of its value. If the value of gold falls very suddenly and sharply the least lucrative mines will be forced to close down. Just how much the value of gold must fall before the point of equilibrium would be reached can only be conjectured. Perhaps the mining experts could tell us whether as much as two thirds of our present output could still be maintained if the purchasing power of each ounce were suddenly cut in two, or whether the output would shrink to half its present volume if the value were reduced one third. In either case, equilibrium would be established. If the output of the mines were to shrink one third, the supply of industrial bullion would be only doubled, not trebled, and its value would be reduced only one half. And if gold production should prove so sensitive as to shrink one half, the industrial supply would be increased only about 50 per cent, and the value of gold would fall only one third. To one who is not a mining authority, the former estimate seems more probable.

What would be the effect of this on the gold reserve? In place

Reports of the Director of the Mint. For a long term of years industrial consumption has accounted for about one fourth of the world's output. The figures for 1909 and 1910 show a sudden increase to more than one third in 1910, owing to the inclusion of an estimate of oriental absorption. The latter is hard to classify either as coinage or as industrial use.

of the 70 per cent with which we started, we should have left something between 35 and 47 per cent. This might perhaps be considered large enough, although prudence would dictate somewhat more. Else why is not the United States seriously tempted to turn an honest penny by replacing all its gold coin and certificates with greenbacks at their present legal gold reserve ratio of approximately 43 1/3 per cent?¹¹

Barring the disastrous effect on an established industry, and the possible loss of confidence in the governmental cash reserves, there is much to be said for this outcome. The gold miner would then know that all his output was increasing the sum total of human benefits and gratifications, whereas at present the thoughtful members of this great profession must be much troubled by the realization that only one ounce out of every three they mine is destined to make the world happier or more beautiful, while the other two will merely swell the volume of the world's currency and aggravate the fall in the purchasing power of the standard of value.

The reader will recall that the foregoing discussion is based on the assumption that the whole world adopts the plan. Of course, that is the ultimate goal to be sought for if the plan is to be adopted at all, since partial adoption would seriously hamper trade by dislocating the rates of international exchange. Reasonably good results might be obtained, however, by a coalition that should include, say, the English-speaking countries, the countries of the Latin Union, Germany, Austria-Hungary, and the Netherlands—countries which possess between them about two thirds of the world's gold coinage. Countries now on a gold-exchange standard could ally themselves to such a union with comparatively little trouble, especially since the bullion value of their silver coins could hardly fall as fast as that of gold, and measured in terms of gold it would actually rise.

How would the value of gold behave under such an alliance? In the first place, the downward effect of the plan would be much delayed in its action, for the gold coinage of the outside nations would be able at first to absorb most of the gold output and keep it off the bullion market, and it might take some ten or fifteen years to fill up this reservoir. What would happen at the end of this period one can hardly venture to predict, even tentatively,

¹¹ $\frac{\$150,000,000}{\$346,681,016}$.

Since writing the above I find that Professor Fisher has suggested 50 per cent as a proper reserve. See *AMERICAN ECONOMIC REVIEW*, Supplement, March, 1913, p. 49.

but it is safe to say that the downward effect on the value of gold produced by the new currency plan, apart from other disturbing influences, would be proportionately less than if the scheme were universal, perhaps 25 or 30 per cent. This estimate is over and above the probable fall in value due to causes apart from changes in the currency system, a fall which Fisher estimates will be enough to raise prices 2 per cent per year or more, as we have already seen. Summing up these estimates, it is conservative to conclude that at the end of ten or fifteen years of such partial adoption of the new currency scheme as is here assumed, gold would be worth not more than about 63 per cent as much as it is now, nor less than 50 per cent. This amount of disturbance is quite substantial, but not alarming. It would call for the most serious consideration, though it need not prove a fatal obstacle to success.

But there is another point which should furnish some food for thought to those who expect the plan to be adopted first by a few nations and then to spread to the rest. For the very reason that the drop in the value of gold would be gradual, it would fall heaviest on those governments that were first to take up the burden of maintaining the value of money independent of that of bullion, and the last to come in would suffer the least loss; just as the United States, having early stopped the free coinage of silver, has the burden of maintaining its "standard" silver at a far greater premium above its bullion value than do the Philippines and Panama, which only recently undertook the task.

So far no mention has been made of the possible gain or loss to the government in the minor ebbings and flowings of gold and currency into and out of the Treasury. It is urged that these would be a source of profit because of the fact that the government would at any time offer to pay fewer dollars for a pound of gold than it would offer to redeem with the same pound of bullion. This conclusion the writer is inclined to doubt, since some movements of the value of gold are liable to last over several of the readjustment periods the plan provides for, and to be checked at length by redeeming a considerable amount of currency, giving more gold for it than was gotten in exchange for it at the original mint price of gold. Or, if the movement were in the other direction, it might not be checked till we had bought a good deal of bullion with currency at a mint price higher than the redemption price that formerly prevailed, when the corresponding bullion was sold for currency.

For instance, if the value of gold falls anything like as fast as the foregoing study indicates, it may take years for the adjustment of the mint price to catch up and bring prices of commodities back to their former level. Meanwhile much currency will have been issued in exchange for bullion at, say, from 27 to 40 or 45 grains to the dollar, most of which will have to be bought back at or near the higher level before the rise in prices can be checked. This would mean a very substantial loss of gold to the Treasury, and would also aggravate the fall in the bullion market. Any long continued movement of gold values offers a chance of loss to offset the chance of profit from fluctuations of shorter duration.

One further possible outcome of the plan is that the governments might step in and buy gold out of current revenues in order to maintain their own specie reserves both directly and by lessening the rise in the bullion value of the dollar. Incidentally, this policy would mitigate the disturbance and possible crisis in the gold-mining industry. If such a policy were to be followed it would be best to govern the purchases by some rigid rule, or else the political pressure of private interests might have unfortunate results. Purchases at a certain rate per month might be prescribed whenever the ratio of gold reserves to redemption liabilities should fall below a given minimum.

The writer presents these speculations as one who believes in the general principle of Professor Fisher's plan, and in the importance of correcting the disturbances that are brought about by changes in the value of gold. Therefore, he wishes the plan to have the benefit of the fullest discussion of its possible results and of the complications that would be sure to attend its adoption.

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APPENDIX

The Bullion Market and Prices: an Inductive Study of Elasticity of Demand.

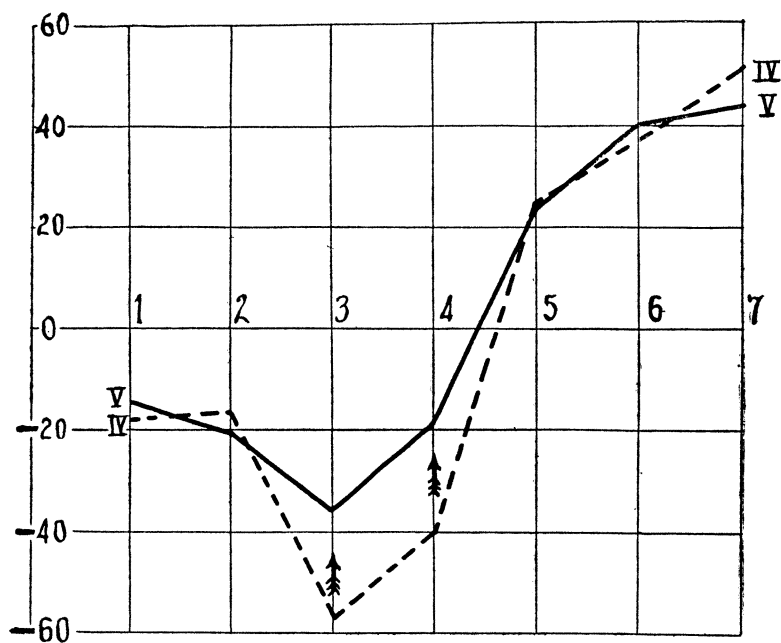
How elastic is the demand for gold for industrial uses? In a general way the increase in the annual industrial consumption of the world appears roughly to keep pace with the increase in the total stock of gold money. From this we may infer, approximately, that any given percentage increase of the rate of industrial supply would have the same effect on the value of gold in this market as an equal percentage increase in the total stock of money would have on its purchasing power, since the values of gold for these two uses go hand in hand.

This conclusion is borne out by such statistical calculations as limited

time has permitted the writer to make. The results of these are shown in the table below. The dates of the observations were chosen with a view to getting periods both of rising and of falling prices (falling and rising value of gold bullion, respectively) undisturbed by panics and depressions, to which the industrial demand for gold is supersensitive. Thus the fifth period reaches from crest to crest of an industrial wave, and the sixth and seventh extend from trough to trough of the same wave. The third and fourth periods are largely spoiled as evidence because they begin in a fairly normal time and end in the depression that followed the panic of 1893.

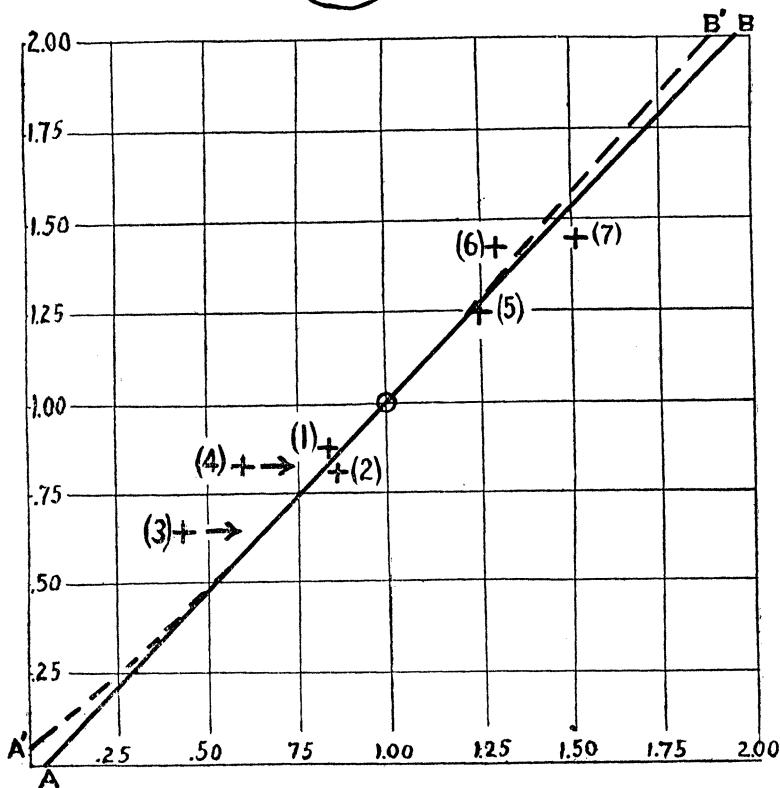
To isolate the effect on consumption produced by changes in value from that produced by growth of population and change in the people's standards of consumption, we must get some idea of the normal rate of growth, and the first two columns are devoted to this task. Column 1 shows the growth, during each period, of the consumption of eight commodities, seven of them being raw materials of manufacture and the eighth fermented liquors. But the use of gold has not grown as fast as that of these eight commodities over long periods, and it is impossible to say just how fast it has grown, apart from the effects of price changes, for there are no two dates far enough apart, which show the same levels of prices and the same states of business activity. But making rough allowance for unavoidable discrepancies, it seems fair to say

CHART I



that the normal growth of gold consumption over the whole period is about four fifths as great as that of the eight commodities considered.¹² And accordingly the figures in column 2 are simply four fifths of those in column 1. Column 4 represents the percentage difference between the actual consumption at the end of each period and the amount that would have been consumed if the rate had grown normally. And, finally, column 6 measures the thing we are after, the degree of correspondence between the figures of column 4 and those of column 5—between the rate of consumption of gold and the reciprocal of its value.

CHART II



Note to chart

Percentage deviations in consumption measured horizontally from unity as a starting point. Corresponding percentage changes in price level measured vertically, from unity as a starting point. Arrows show direction of correction for known flaws in data. Dotted line indicates probable way in which actual demand curve deviates from the straight line $y = 1.03x - .03$, which represents the geometrical average of the five most valid observations.

Period taken	1 Increase in consumption of 8 materials during period	2 Assumed normal increase in industrial consumption of gold	3 Actual increase in industrial consumption of gold	4 Deviation of actual consumption at end of period from what it would have been had it grown normally ¹	5 Change in price level during period	6 Ratio of 5 to 4
	Per cent	Per cent	Per cent	Per cent	Per cent	
1. 1880 to 1892	92.8	73	40	-19	-14.3	.817
2. 1882-3 to 1892	71.7	56	29	-17	-20	1.18
3. 1882-3 to 1897	98.0	78	-19.4	-59 ²	-35	.60 ³
4. 1892 to 1897	9.5	7.6	-37.2	-41 ²	-17.8	.43 ³
5. 1892 to 1907	101.8	81	126	+25	+24	.96
6. 1894-5 to 1908-9	103.4	83	136	+28	+41	1.46 ⁴
7. 1894- to 1908-10	110.6	88	183	+50.5	+44	.87 ⁴

The data for column 1 are taken from the *Statistical Abstract of the U. S.*, those for column 3 from the reports of the Director of the Mint, and those for column 5 by combining the index number on p. 304 of Irving Fisher's *Purchasing Power of Money* with that on p. 141 of Kemmerer's *Money and Prices*.

¹ For example, in line 1, $\frac{100 + 40}{100 + 72} = .82$, or 1 — .18.

² Depression in 1897 aggravates this negative deviation.

³ Figure too low, for reason given in note 2.

⁴ The difference between the last two readings in this column, covering practically the same period, is due to the fact that the falling off in consumption following the panic of 1907 was practically all felt in the year 1908. Measured by a two-year average the 1907 panic produced more disturbance to gold consumption than that of 1897, while if spread over a three-year average the later disturbance is less than the earlier. Both figures are therefore included.

Considering the rough nature of the observations, the correspondence between columns 4 and 5 is remarkably close, especially when one notices that the three greatest deviations are directly explained by known disturbing elements in the data. This correspondence is still more striking when shown graphically (chart I), the arrows indicating the direction of the correction needed to counteract the effect of known flaws in the observations, as shown in the comments on the table.

The simple average of all readings in column 6 of the table, good and bad together, is .9 and the median of the five most valid readings is .96, and their geometrical average 1.03, while in the period of rising prices the most moderate price change is 87 per cent of the corresponding deviation in consumption, and the geometrical average of the three is 104 per cent.

Another graphic illustration (chart II) shows by the dotted line A'B' the direction and general character of the probable demand curve that is indicated by these observations. The upward curvature of this line is deduced, not so much from the position of points 3 and 4, which are admittedly wrong, as from the following facts: (1) If the value of gold were to increase indefinitely, consumption would cease somewhat before its value reached infinity (and prices reached zero). Hence the curve starts from a point on the y axis slightly above the origin. (2) If the supply of gold were to increase indefinitely, it would ultimately become a free good and consumption would somewhere reach its maximum limit. Hence the curve ends by becoming vertical, prices of goods in terms of gold going to infinity. According to this diagram, the gold prices of goods should be more than trebled by trebling the supply of industrial bullion in the way suggested in the foregoing article.

J. M. C.

¹² A widely different value for this factor would make the results for periods of rising prices show discrepancies from those for periods of falling prices, but would have practically no effect on the geometrical average of the two sets of periods.